

0185653.ST25.txt  
SEQUENCE LISTING

<110> Hoshino , Tatsuo  
Miyazaki, Taro  
Sugisawa, Teruhide

<120> Aldehyde Dehydrogenase Gene

<130> C038435/0185653

<160> 9

<170> PatentIn version 3.3

<210> 1

<211> 3408

<212> DNA

<213> Gluconobacter oxydans

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## 0185653.ST25.txt

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## 0185653.ST25.txt

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<210> 2  
 <211> 609  
 <212> PRT  
 <213> Gluconobacter oxydans

<400> 2

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Ala Ala Ser Thr Leu Ala Leu Met Ile Gly Ala Gly Ala His Ala Gln  
 20 25 30

Val Asn Pro Val Glu Val Pro Val Gly Ala Asn Glu Thr Phe Thr Ser  
 35 40 45

Arg Val Leu Thr Thr Gly Leu Ser Asn Pro Trp Glu Ile Thr Trp Gly  
 50 55 60

Pro Asp Asn Met Leu Trp Val Thr Glu Arg Ser Ser Gly Glu Val Thr  
 65 70 75 80

Arg Val Asp Pro Asn Thr Gly Glu Gln Gln Val Leu Leu Thr Leu Thr  
 85 90 95

Asp Phe Ser Val Asp Val Gln His Gln Gly Leu Leu Gly Leu Ala Leu  
 100 105 110

His Pro Glu Phe Met Gln Glu Ser Gly Asn Asp Tyr Val Tyr Ile Val  
 115 120 125

Tyr Thr Tyr Asn Thr Gly Thr Glu Glu Ala Pro Asp Pro His Gln Lys  
 130 135 140

Leu Val Arg Tyr Ala Tyr Asp Ala Ala Ala Gln Gln Leu Val Asp Pro  
 145 150 155 160

Val Asp Leu Val Ala Gly Ile Pro Ala Gly Asn Asp His Asn Gly Gly  
 165 170 175

Arg Ile Lys Phe Ala Pro Asp Gly Gln His Ile Phe Tyr Thr Leu Gly  
 180 185 190

0185653.ST25.txt

Glu Gln Gly Ala Asn Phe Gly Gly Asn Phe Arg Arg Pro Asn His Ala  
 195 200 205  
 Gln Leu Leu Pro Thr Gln Glu Gln Val Asp Ala Gly Asp Trp Val Ala  
 210 215 220  
 Tyr Ser Gly Lys Ile Leu Arg Val Asn Leu Asp Gly Thr Ile Pro Glu  
 225 230 235 240  
 Asp Asn Pro Glu Ile Glu Gly Val Arg Ser His Ile Phe Thr Tyr Gly  
 245 250 255  
 His Arg Asn Pro Gln Gly Ile Thr Phe Gly Pro Asp Gly Thr Ile Tyr  
 260 265 270  
 Ala Thr Glu His Gly Pro Asp Thr Asp Asp Glu Leu Asn Ile Ile Ala  
 275 280 285  
 Gly Gly Gly Asn Tyr Gly Trp Pro Asn Val Ala Gly Tyr Arg Asp Gly  
 290 295 300  
 Lys Ser Tyr Val Tyr Ala Asp Trp Ser Gln Ala Pro Ala Asp Gln Arg  
 305 310 315 320  
 Tyr Thr Gly Arg Ala Gly Ile Pro Asp Thr Val Pro Gln Phe Pro Glu  
 325 330 335  
 Leu Glu Phe Ala Pro Glu Met Val Asp Pro Leu Thr Thr Tyr Trp Thr  
 340 345 350  
 Val Asp Asn Asp Tyr Asp Phe Thr Ala Asn Cys Gly Trp Ile Cys Asn  
 355 360 365  
 Pro Thr Ile Ala Pro Ser Ser Ala Tyr Tyr Tyr Ala Ala Gly Glu Ser  
 370 375 380  
 Gly Ile Ala Ala Trp Asp Asn Ser Ile Leu Ile Pro Thr Leu Lys His  
 385 390 395 400  
 Gly Gly Ile Tyr Val Gln His Leu Ser Asp Asp Gly Gln Ser Val Asp  
 405 410 415  
 Gly Leu Pro Glu Leu Trp Phe Ser Thr Gln Asn Arg Tyr Arg Asp Ile  
 420 425 430  
 Glu Ile Ser Pro Asp Asn His Val Phe Val Ala Thr Asp Asn Phe Gly  
 435 440 445

Thr Ser Ala Gln Lys Tyr Gly Glu Thr Gly Phe Thr Asn Val Leu His  
 450 455 460

Asn Pro Gly Ala Ile Leu Val Phe Ser Tyr Val Gly Glu Asp Ala Ala  
 465 470 475 480

Gly Gln Thr Gly Met Met Thr Ala Pro Ala Pro Gln Thr Gln Tyr Thr  
 485 490 495

Gln Val Pro Ala Glu Gly Ala Gly Ala Gly Ala Thr Glu Val Ala Asp  
 500 505 510

Val Asp Tyr Asp Thr Leu Phe Thr Glu Gly Gln Thr Leu Tyr Gly Ser  
 515 520 525

Ala Cys Ala Ala Cys His Gly Ala Ala Gly Gln Gly Ala Gln Gly Pro  
 530 535 540

Thr Phe Val Gly Val Pro Asp Val Thr Gly Asp Lys Asp Tyr Leu Ala  
 545 550 555 560

Arg Thr Ile Ile His Gly Phe Gly Tyr Met Pro Ser Phe Ala Thr Arg  
 565 570 575

Leu Asp Asp Glu Glu Val Ala Ala Ile Ala Thr Phe Ile Arg Asn Ser  
 580 585 590

Trp Gly Asn Asp Glu Gly Ile Leu Thr Pro Ala Glu Ala Ala Ala Thr  
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Arg

<210> 3  
 <211> 14  
 <212> PRT  
 <213> Gluconobacter oxydans

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 <222> (2)..(2)  
 <223> X can be any naturally occurring amino acid.

<220>  
 <221> X  
 <222> (4)..(4)  
 <223> X is P or K.

<400> 3

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 <400> 4

Met Leu Pro Lys Ser Leu Lys His Lys Asn Gly Ala Met Arg Leu Val  
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Ala Ala Ser Thr Leu Ala Leu Met Ile Gly Ala Gly Ala His Ala  
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<210> 5  
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Ser Arg Val Leu Thr Thr Gly Leu Ser Asn Pro Trp Glu Ile Thr Trp  
 20 25 30

Gly Pro Asp Asn Met Leu Trp Val Thr Glu Arg Ser Ser Gly Glu Val  
 35 40 45

Thr Arg Val Asp Pro Asn Thr Gly Glu Gln Gln Val Leu Leu Thr Leu  
 50 55 60

Thr Asp Phe Ser Val Asp Val Gln His Gln Gly Leu Leu Gly Leu Ala  
 65 70 75 80

Leu His Pro Glu Phe Met Gln Glu Ser Gly Asn Asp Tyr Val Tyr Ile  
 85 90 95

Val Tyr Thr Tyr Asn Thr Gly Thr Glu Glu Ala Pro Asp Pro His Gln  
 100 105 110

Lys Leu Val Arg Tyr Ala Tyr Asp Ala Ala Ala Gln Gln Leu Val Asp  
 115 120 125

Pro Val Asp Leu Val Ala Gly Ile Pro Ala Gly Asn Asp His Asn Gly  
 130 135 140

## 0185653.ST25.txt

Gly Arg Ile Lys Phe Ala Pro Asp Gly Gln His Ile Phe Tyr Thr Leu  
 145 150 155 160

Gly Glu Gln Gly Ala Asn Phe Gly Gly Asn Phe Arg Arg Pro Asn His  
 165 170 175

Ala Gln Leu Leu Pro Thr Gln Glu Gln Val Asp Ala Gly Asp Trp Val  
 180 185 190

Ala Tyr Ser Gly Lys Ile Leu Arg Val Asn Leu Asp Gly Thr Ile Pro  
 195 200 205

Glu Asp Asn Pro Glu Ile Glu Gly Val Arg Ser His Ile Phe Thr Tyr  
 210 215 220

Gly His Arg Asn Pro Gln Gly Ile Thr Phe Gly Pro Asp Gly Thr Ile  
 225 230 235 240

Tyr Ala Thr Glu His Gly Pro Asp Thr Asp Asp Glu Leu Asn Ile Ile  
 245 250 255

Ala Gly Gly Gly Asn Tyr Gly Trp Pro Asn Val Ala Gly Tyr Arg Asp  
 260 265 270

Gly Lys Ser Tyr Val Tyr Ala Asp Trp Ser Gln Ala Pro Ala Asp Gln  
 275 280 285

Arg Tyr Thr Gly Arg Ala Gly Ile Pro Asp Thr Val Pro Gln Phe Pro  
 290 295 300

Glu Leu Glu Phe Ala Pro Glu Met Val Asp Pro Leu Thr Thr Tyr Trp  
 305 310 315 320

Thr Val Asp Asn Asp Tyr Asp Phe Thr Ala Asn Cys Gly Trp Ile Cys  
 325 330 335

Asn Pro Thr Ile Ala Pro Ser Ser Ala Tyr Tyr Tyr Ala Ala Gly Glu  
 340 345 350

Ser Gly Ile Ala Ala Trp Asp Asn Ser Ile Leu Ile Pro Thr Leu Lys  
 355 360 365

His Gly Gly Ile Tyr Val Gln His Leu Ser Asp Asp Gly Gln Ser Val  
 370 375 380

Asp Gly Leu Pro Glu Leu Trp Phe Ser Thr Gln Asn Arg Tyr Arg Asp  
 385 390 395 400

0185653.ST25.txt

Ile Glu Ile Ser Pro Asp Asn His Val Phe Val Ala Thr Asp Asn Phe  
405 410 415

Gly Thr Ser Ala Gln Lys Tyr Gly Glu Thr Gly Phe Thr Asn Val Leu  
420 425 430

His Asn Pro Gly Ala Ile Leu Val Phe Ser Tyr Val Gly Glu Asp Ala  
435 440 445

Ala Gly Gln Thr Gly Met Met Thr Ala Pro Ala Pro Gln Thr Gln Tyr  
450 455 460

Thr Gln Val Pro Ala Glu Gly Ala Gly Ala Gly Ala Thr Glu Val Ala  
465 470 475 480

Asp Val Asp Tyr Asp Thr Leu Phe Thr Glu Gly Gln Thr Leu Tyr Gly  
485 490 495

Ser Ala Cys Ala Ala Cys His Gly Ala Ala Gly Gln Gly Ala Gln Gly  
500 505 510

Pro Thr Phe Val Gly Val Pro Asp Val Thr Gly Asp Lys Asp Tyr Leu  
515 520 525

Ala Arg Thr Ile Ile His Gly Phe Gly Tyr Met Pro Ser Phe Ala Thr  
530 535 540

Arg Leu Asp Asp Glu Glu Val Ala Ala Ile Ala Thr Phe Ile Arg Asn  
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Ser Trp Gly Asn Asp Glu Gly Ile Leu Thr Pro Ala Glu Ala Ala Ala  
565 570 575

Thr Arg

<210> 6  
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<220>  
<223> an artificially synthesized primer sequence

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<221> r  
<222> (3)..(3)  
<223> r is g or a



<220>  
 <221> y  
 <222> (6)..(6)  
 <223> y is t/u or c

<220>  
 <221> s  
 <222> (12)..(12)  
 <223> s is g or c

<220>  
 <221> b  
 <222> (15)..(15)  
 <223> b is g or c or t/u

<400> 6  
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17

<210> 7  
 <211> 17  
 <212> DNA  
 <213> Artificial

<220>  
 <223> an artificially synthesized primer sequence

<220>  
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 <222> (3)..(3)  
 <223> y is t/u or c

<220>  
 <221> n  
 <222> (9)..(9)  
 <223> n is a or g or c or t

<220>  
 <221> misc\_feature  
 <222> (9)..(9)  
 <223> n is a, c, g, or t

<220>  
 <221> r  
 <222> (12)..(12)  
 <223> r is g or a

<220>  
 <221> v  
 <222> (15)..(15)  
 <223> v is a or g or c

<400> 7  
 gtytcgttng crccvac

17

<210> 8  
 <211> 15  
 <212> DNA  
 <213> Artificial

<220>

<223> an artificially synthesized primer sequence

<400> 8  
cagggtaacc cggtc

15

<210> 9  
<211> 15  
<212> DNA  
<213> Artificial

<220>  
<223> an artificially synthesized primer sequence

<400> 9  
gactcgtttg cgccc

15